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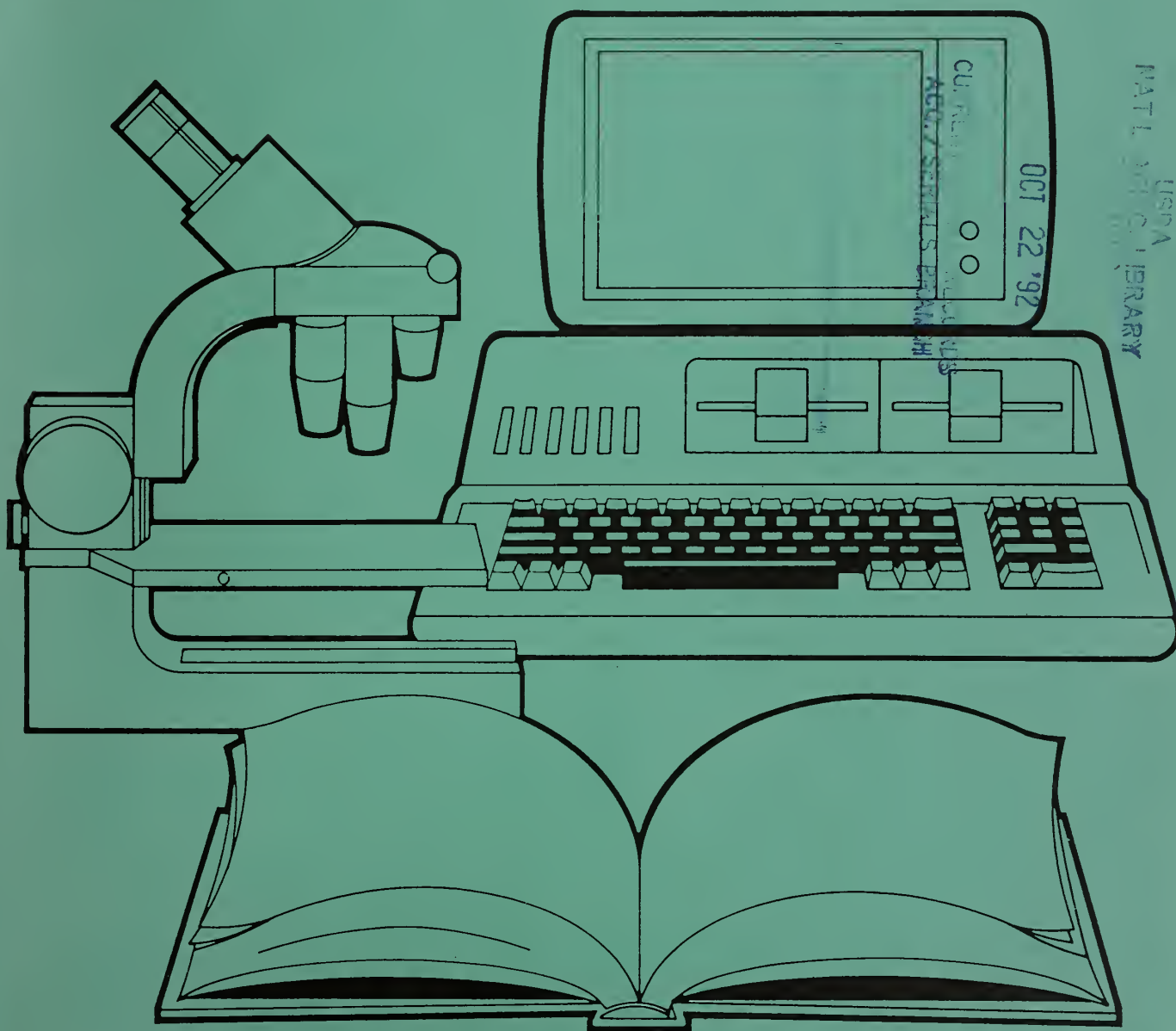
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Number 119

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# Biotechnology in Agriculture, 1986 - May 1992

## Citations from AGRICOLA Concerning Diseases and Other Environmental Considerations







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## Citations from AGRICOLA Concerning Diseases and Other Environmental Considerations

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Beltsville, Maryland  
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## FOREWORD

This is the 46th volume in a series of commodity-oriented environmental bibliographies resulting from a memorandum of understanding between the U.S. Department of Agriculture, National Agricultural Library (USDA-NAL), and the U.S. Environmental Protection Agency, Office of Pesticide Programs (EPA-OPP).

This close working relationship between the two agencies will produce a series of bibliographies which will be useful to EPA in the regulation of pesticides, as well as to any researcher in the field of plant or commodity protection. The broad scope of information contained in this series will benefit USDA, EPA, and the agricultural community as a whole.

The sources referenced in these bibliographies include the majority of the latest available information from U.S. publications involving commodity protection throughout the growing and processing stages for each agricultural commodity.

We welcome the opportunity to join this cooperative effort between USDA and EPA in support of the national agricultural community.

JOSEPH H. HOWARD, Director  
National Agricultural Library

DOUGLAS D. CAMPT, Director  
Office of Pesticide Programs



## INTRODUCTION

The citations in this bibliography, Biotechnology in Agriculture, 1986 - May 1992, are selected from the AGRICOLA database and cover diseases, insects, nematodes, weeds, chemicals, and other environmental considerations.

This is the 46th volume in a series of commodity-oriented listings of citations from AGRICOLA jointly sponsored by the U.S. Department of Agriculture, National Agricultural Library (USDA-NAL), and the U.S. Environmental Protection Agency, Office of Pesticide Programs (EPA-OPP). During the past year, subjects in this series included The Protection of Stored Grains; The Protection of Nut Crops; The Protection of Peanuts; The Protection of Tomatoes, Egg Plants, and Peppers; and The Protection of Lawn and Turf Grasses. Other titles to be issued during the current year are The Protection of Corn, The Protection of Pome Fruits, and Methylbromide and Its Alternatives As Fumigants.

Entries in the bibliography are subdivided into a series of section headings used in the contents of the Bibliography of Agriculture. Each item appears under every section heading assigned to the cited document. A personal author index accompanies this publication. Subject and site indices may be obtained after January 1993 by writing to the address below.

The U.S. Environmental Protection Agency contact for this project is Richard B. Peacock, Office of Pesticides and Toxic Substances.

Any comments or questions concerning this bibliography may be addressed to:

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FOTEA. Wasserman, B.P. Eiberger, L.L.; McCarthy, K.J. Chicago, Ill. : Institute of Food Technologists. Abstract: A literature review examines the occurrence and regulation of glucan biosynthesis in higher plants, with particular emphasis on beta-glucan synthase found in edible vegetable tissue. This enzyme is membrane-bound, and is believed to be involved in the biosynthesis of cellulose and/or mixed-linkage glucans. Various aspects of glucan biosynthesis in non-edible tissue are discussed, and the occurrence of fruit and vegetable glucan synthases and the properties and isolation of red beet glucan synthase are described. A discussion of the prospects for genetic engineering of plant enzymes also is included. (wz). Food technology. Literature review. May 1986. v. 40 (5). p. 90-93, 96-98. ill., charts. Includes 110 references. (NAL Call No.: DNAL 389.8 F7398).

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FOTEA. Chicago, Ill. : Institute of Food Technologists. Abstract: An overview article describes how plant tissue cultures are used to develop flavors. The stepwise plant tissue culture procedure used for producing strawberry flavor is presented and illustrated with color photographs. Various functional bioreactors for cell growth are reported. A compilation of plant tissue culture studies conducted on fruits besides strawberries is included.(wz). Food technology. April 1986. v. 40 (4). p. 122, 124-129. ill., charts. Includes 26 references. (NAL Call No.: DNAL 389.8 F7398).

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ANYAA9. Bryers, J.D. Yeh, T. New York, N.Y. : The Academy. Annals of the New York Academy of Sciences. In the series analytic: Biochemical Engineering VI / edited by W.E. Goldstein, D. DiBiasio, and H. Pedersen. 1990. v. 589. p. 315-332. Includes references. (NAL Call No.: DNAL 500 N484).

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**Hormonal and stress regulation of gene expression in cereal aleurone layers.**

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NASSD. Lee-Stadelmann, O.Y. Lee, S.; Chung, H.;  
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XGTIA. Weber, D.J. Hegerhorst, D.F.; Bhat, R.B.; Davis, T.D.; McArthur, E.D. Ogden, Utah : The Station. General technical report INT - U.S. Department of Agriculture, Forest Service, Intermountain Research Station. Paper presented at a "Symposium on Shrub Ecophysiology and Biotechnology." June 30-July 2, 1987, Logan, Utah. Feb 1989. (256). p. 173-183. Includes references. (NAL Call No.: DNAL aSD11.A48).

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**Phytochemistry--its role in the future of plant biotechnology 1987.**  
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**Plant biotechnology and the production of flavor compounds.**  
FOTEA. Whitaker, R.J. Evans, D.A. Chicago, Ill. : Institute of Food Technologists. Abstract: A detailed technical overview discusses the production of flavoring compounds in plants and tissue cultures using biotechnology techniques. Topics include: the metabolic complexity of natural plant products; the chemical complexity of natural flavors; the characteristics, status, and techniques of plant tissue culture biotechnology; potentials for agricultural chemical production; scale-up of cell culture chemical production; the importance of ensuring genetic stability in maintaining plant cell cultures; biotransformation studies using plant cells to economically produce specific chemicals; and technological challenges concerning the scale-up of plant cell cultures. Potential future trends in plant tissue culture biotechnology also are discussed.(wz). Food technology. based on a paper presented during the symposium, "Flavor trends and technologies," sponsored by the Chicago Section of the Institute of Food Technologists, March 9, 1987, Chicago, IL. Sept 1987. v. 41 (9). p. 86-101 (not consecutive). ill., charts. Includes 34 references. (NAL Call No.: DNAL 389.8 F7398).

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BIPRET. Bramble, J.L. Graves, D.J.; Brodelius, P. New York, N.Y. : American Institute of Chemical Engineers. Biotechnology progress. Nov/Dec 1990. v. 6 (6). p. 425-457. Includes references. (NAL Call No.: DNAL TP248.2.B46).



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**Plant tissue culture germinates in the marketplace.**

Best, D. Best, L. Chicago, Ill. : Gorman  
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culture (PTC) is a sub-category of  
biotechnology with important applications in  
agriculture and the food industry. PTC  
techniques allow for the generation of whole  
plants from single cells maintained in  
artificial media through the manipulation of  
their chemical and physical environments.  
Advantages of PTC are 1) rapid development and  
breeding of new plant varieties, 2) engineering  
of new combinations of genetic traits in  
plants, and 3) rapid propagation of plants with  
superior qualities for agricultural production.  
Current projects underway in plant tissue  
culture research include the production of  
products (natural, flavors, colors, enzymes,  
complex carbohydrates, specialty oil fractions,  
pharmaceuticals) in industrial-scale  
fermentation vats called bioreactors.  
Bioreactor models and systems currently being  
investigated are described. Advantages of  
immobilized cell cultures are outlined.  
Economic trends and priorities in the field of  
plant cell culture technology are discussed.  
Future possibilities for PTC research in the  
food industry include identification and  
production of non-caloric, plant-derived  
sweeteners and the manufacture of natural  
flavors, spice extracts and oleoresins, and  
colors.(aje). Prepared foods. Nov 1986. v. 155  
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references. (NAL Call No.: DNAL TP248.2.B5537).

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**Potential for exploiting vesicular-arbuscular mycorrhizas in agriculture.**

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**The potential impact of ice-minus bacteria as a frost protectant in New York tree fruit production.**

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v. 18 (1). p. 26-34. maps. Includes references.  
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ANYAA9. Bailey, J.E. Axe, D.D.; Doran, P.M.; Galazzo, J.L.; Reardon, K.F.; Seressiotis, A.; Shanks, J.V. New York, N.Y. : The Academy. Annals of the New York Academy of Sciences. In the series analytic: Biochemical engineering V / edited by M.L. Shuler and W.A. Weigand. Paper presented at the Fifth Biochemical Engineering Conference, July 26-August 1, 1987, Henniker, New Hampshire. 1987. v. 506. p. 1-23. Includes references. (NAL Call No.: DNAL 500 N484).

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**Regeneration of peanut and perennial peanut from cultured leaf tissue.**

CRPSAY. McKently, A.H. Moore, G.A.; Gardner, F.P. Madison, Wis. : Crop Science Society of America. Successful utilization of biotechnology for the improvement of peanut, *Arachis hypogaea* L., will be made possible through development and optimization of tissue culture regeneration systems. This study evaluated plant development via organogenesis from in vitro-cultured immature leaf tissue of the cultivated peanut and a perennial peanut species, *A. glabrata* Benth. Leaflets, 5 mm in length from peanut seedlings and 5 to 10 mm in length from perennial peanut plants, were cultured in vitro on Murashige and Skoog medium supplemented with 1 mg L<sup>-1</sup> 1-naphthaleneacetic acid (NAA) and four concentrations (1, 3, 5, and 10 mg L<sup>-1</sup>) of 6-benzylaminopurine (BA). Bud regeneration occurred from the adaxial surface of the cultivated peanut explants on all BA concentrations, with the largest quantity produced on 5 mg L<sup>-1</sup>. Eighty-four percent of

the cultures with bud tissue continued growth and differentiation into shoots within 120 d. These shoots developed roots within 30 d of transfer to basal medium supplemented with 1 mg L<sup>-1</sup> NAA. Plantlets transferred to soil and placed in a greenhouse developed successfully, matured, and set seed. Phenotypic variation was not observed. A wide range of cultivated peanut genotypes was evaluated for organogenic responsiveness. The perennial peanut leaf explants callused and produced shoot meristems within 50 d of culture. Ten percent of the meristems continued growth and development into whole plants. Crop science. May/June 1991. v. 31 (3). p. 833-837. Includes references. (NAL Call No.: DNAL 64.8 C883).

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ABIPDT. Parr, A.J. New York, N.Y. : Allan R. Liss. Advances in biotechnological processes. In the series analytic: Biotechnology in agriculture / edited by A. Mizrahi.~ Literature review. 1988. v. 9. p. 1-34. Includes references. (NAL Call No.: DNAL TP248.13.A38).

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FOTEA. Chicago, Ill. : Institute of Food Technologists. Abstract: An overview article describes how plant tissue cultures are used to develop flavors. The stepwise plant tissue culture procedure used for producing strawberry flavor is presented and illustrated with color photographs. Various functional bioreactors for cell growth are reported. A compilation of plant tissue culture studies conducted on fruits besides strawberries is included.(wz). Food technology. April 1986. v. 40 (4). p. 122, 124-129. ill., charts. Includes 26 references. (NAL Call No.: DNAL 389.8 F7398).

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Gibbs, J.N. Kahan, J.S. New York, N.Y. : Nature Pub. Co. Bio/technology. Mar 1986. v. 4 (3). p. 199, 201, 203-205. ill. Includes references. (NAL Call No.: DNAL QH442.B5).

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Lancaster, Pa., USA : Technomic Pub. Co., 1988. vi, 146 p. : ill. ; 28 cm. Includes bibliographical references (p. 145-146). (NAL Call No.: DNAL TP248.65.F66B59).

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**Biotechnology in the food industry /M.P. Tombs.**

Tombs, M. P. Englewood Cliffs, N.J. : Prentice Hall, c1991. ix, 189 p. : ill. ; 24 cm. Includes bibliographical references (p. 177 -181) and index. (NAL Call No.: DNAL TP248.65.F66T664 1991).

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**Diversification of the agricultural product portfolio through biotechnology.**

Villet, R.H. Washington, D.C. : The Department. Outlook - Proceedings, Agricultural Outlook Conference, U.S. Department of Agriculture. Paper presented at "Agriculture in a world of change," November 27-29, 1990, Washington, DC. Mar 1991. (67th). p. 648-652. (NAL Call No.: DNAL 1.90 C20U8).

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FOTEA. Wasserman, B.P. Chicago, Ill. : Institute of Food Technologists. Abstract: This article reviews innovative uses of enzymes in food technology. Some of the topics discussed include protein engineering and three-dimensional structure determination, use of enzymes in organic solvents, enzyme mimics and development of superior thermostable enzymes. Food technology. Apr 1990. v. 44 (4). p. 118, 120-122. charts. Includes 58 references. (NAL Call No.: DNAL 389.8 F7398).

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### **Food biotechnology.**

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### **Food biotechnology regulation: Overview and selected issues.**

FOTEA. Korwek, E.L. Chicago, Ill. : Institute of Food Technologists. Abstract: Government agencies, laws and regulations that apply to foods developed by biotechnology are discussed. Food technology. Mar 1990. v. 44 (3). p. 76-78, 80. charts. Includes 15 references. (NAL Call No.: DNAL 389.8 F7398).

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### **Food security: a technological alternative.**

BISNA. Rogoff, M.H. Rawlins, S.L. Washington, D.C. : The Institute. BioScience - American Institute of Biological Sciences. Dec 1987. v. 37 (11). p. 800-807. ill. Includes references. (NAL Call No.: DNAL 500 AM322A).

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### **Global status of agriculture and food production.**

Bentley, D.G. Bethesda, Md. : Agricultural Research Institute, c1987. Public perceptions of biotechnology / editors L.R. Batra, W. Klassen. p. 13-20. (NAL Call No.: DNAL TP248.2.P8).

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### **Plant tissue culture germinates in the marketplace.**

Best, D. Best, L. Chicago, Ill. : Gorman Publishing Company. Abstract: Plant tissue culture (PTC) is a sub-category of biotechnology with important applications in agriculture and the food industry. PTC techniques allow for the generation of whole plants from single cells maintained in artificial media through the manipulation of their chemical and physical environments. Advantages of PTC are 1) rapid development and breeding of new plant varieties, 2) engineering of new combinations of genetic traits in plants, and 3) rapid propagation of plants with superior qualities for agricultural production. Current projects underway in plant tissue culture research include the production of products (natural, flavors, colors, enzymes, complex carbohydrates, specialty oil fractions, pharmaceuticals) in industrial-scale fermentation vats called bioreactors. Bioreactor models and systems currently being investigated are described. Advantages of immobilized cell cultures are outlined. Economic trends and priorities in the field of

plant cell culture technology are discussed. Future possibilities for PTC research in the food industry include identification and production of non-caloric, plant-derived sweeteners and the manufacture of natural flavors, spice extracts and oleoresins, and colors.(aje). Prepared foods. Nov 1986. v. 155 (12). p. 90-92, 94. ill. (NAL Call No.: DNAL HD9000.1.F646).

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### **Potential applications of plant cell culture.**

Evans, D. Sharp, W. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 133-143. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

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### **Proceedings of the Cacao Biotechnology Symposium /edited by Paul S. Dimick.**

Dimick, Paul S. University Park, Pa. : Dept. of Food Science, College of Agriculture, Pennsylvania State University, c1986. "This symposium was presented as a contribution to the E.A. Day Memorial Lecture Series of the Department of Food Science at the Pennsylvania State University"--Pref.~ Spine title: Cacao biotechnology. vii, 154 p. : ill. ; 28 cm. Includes bibliographies. (NAL Call No.: DNAL HD9200.A2C3 1985).

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### **Thermodynamics of industrially-important, enzyme-catalyzed reactions.**

JSBID. Tewari, Y.B. Clifton, N.J. : Humana Press. Applied biochemistry and biotechnology. Mar 1990. v. 23 (3). p. 187-203. Includes references. (NAL Call No.: DNAL QD415.A1J62).

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### **Who wins and who loses from agriculture and food biotechnology some policy implications /Ronald D. Knutson.**

Knutson, Ronald D. College Station : Agricultural and Food Policy Center, Dept. of Agricultural Economics, Texas Agricultural Experiment Station, Texas Agricultural Extension Service, Texas A&M University, 1988. "May 1988.". 11 leaves ; 28 cm. Bibliography: leaf 11. (NAL Call No.: DNAL HD1751.A4 no.88-7).

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**Biotechnology and agriculture emergence of bovine somatotropin (bST) /By Don P. Blayney, Richard F. Fallert.**  
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**Projecting adoption rates: application of an ex ante procedure to biotechnology products.**  
Lesser, W. Magrath, W.; Kalter, R. West Lafayette, Ind. : Purdue University. North Central journal of agricultural economics. July 1986. v. 8 (2). p. 159-174. Includes 29 references. (NAL Call No.: DNAL HD1773.A3N6).

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**Quality and characteristics of an adequate milk supply.**  
Ithaca, N.Y. : The Department. A.E. Ext. - New York State College of Agriculture and Life Sciences, Cornell University, Department of Agricultural Economics. Paper presented at a Governor's Conference on Staying Competitive Into the 21st Century, June 21-22, 1988, Albany, New York. Comments by D.L. Call, p. 2-8. Aug 1989. (89-18). p. 17-20. (NAL Call No.: DNAL 281.9 C81AE).

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Washington, DC : The Office : For sale by the Supt. of Docs., U.S. G.P.O., 1991. "May 1991"--P. 4 of cover.~ "OTA-F-470"--P. 4 of cover. v, 118 p. : ill., map ; 26 cm. Includes bibliographical references. (NAL Call No.: DNAL HD9275.U52U5).

# FOOD SCIENCE, LIVESTOCK

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**Ex Ante evaluation of the economic impact of agricultural biotechnology: The case of porcine somatotropin: Comment.**

Meltzer, M.I. Ames, Iowa : American Agricultural Economics Association. American journal of agricultural economics. Reply by C.M. Lemieux and M.K. Wohlgenant, p. 1284-1287. Nov 1991. v. 73 (4). p. 1279-1283. Includes references. (NAL Call No.: DNAL 280.8 J822).

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**Altered harvest agriculture, genetics, and the fate of the world's food supply /by Jack Doyle.** --.

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Harlander, S. Lexington : Kentucky Agricultural Experiment Station, 1988. Biotechnology and agricultural cooperatives : opportunities and challenges / edited by William B. Lacy and Lawrence Busch. Literature review. p. 40-48. Includes references. (NAL Call No.: DNAL S494.5.B563B59).

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Bills, Donald D., 1932-; Kung, Shain-dow.; Westhoff, Dennis C. Boston : Butterworth-Heinemann, c1990. xiii, 381 p. : ill. ; 24 cm. Includes bibliographical references. (NAL Call No.: DNAL TP248.65.F66B582).

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**Biotechnology and the food system.**

Doyle, J. Washington, D.C. : National Center for Food and Agric Policy, Resources for the Future, c1988. Consumer demands in the marketplace : public policies related to food safety, quality, and human health : proceedings of a workshop held in Airlie, Virginia, October 27-29, 1986 / Katherine L. Clancy, editor. p. 37-42. Includes references. (NAL Call No.: DNAL HD9000.9.U5C6).

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JJASDH. Schmid, R.D. Champaign, Ill. : The Society. Journal of the American Oil Chemists' Society. Apr 1987. v. 64 (4). p. 563-570. ill. Includes references. (NAL Call No.: DNAL 307.8 J82).

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**BIOTECHNOLOGY: Consumer concerns about risks and values.**

FOTEA. Busch, L. Chicago, Ill. : Institute of Food Technologists. Many scientists would argue that the new food technologies now under development promise many benefits with few consequential risks associated with problems of food spoilage or adulteration, such as Salmonella poisoning, and note that we now have the safest, most secure food supply in the world. Food technology. Apr 1991. v. 45 (4). p. 96, 98, 100-101. Includes references. (NAL Call No.: DNAL 389.8 F7398).

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**Biotechnology in food processing /edited by Susan K. Harlander and Theodore P. Labuza. --.** Harlander, Susan K.; Labuza, Theodore P. Park Ridge, N.J. : Noyes Publications, c1986. xxvi, 323 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP248.2.B5537).

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Moshy, R. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 1-14. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

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**Engineering properties of foods /edited by M.A. Rao, S.S.H. Rizvi.**

Rao, M. A., 1937-; Rizvi, S. S. H., 1948-. New York : M. Dekker, c1986. Abstract: A reference text for food processing and agricultural engineers and technologists, food scientists, and biotechnologists, covers detailed definitions and the theoretical basis for various food engineering properties, methods for determining such properties, and the effects of these properties on different foods. Properties important to food processing technology are considered in detail, including: fluid flow, heat and mass transfer, concentration, dehydration, rheological properties of both solid and liquid foods, and dielectric properties of importance to microwave thawing and sterilization. Discussions of thermal and thermodynamic properties and the physico-chemical properties of food in reverse osmosis and ultrafiltration systems also are included. Numerous mathematical equations, graphical relationships, and data tables are presented throughout the text, and reference citations are appended to each of the chapters. viii, 398 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP372.5.E54).

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**Engineering the foods of the future.**

CFWOD. Harlander, S. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. Nov 1990. v. 35 (11). p. 1106-1109. charts. Includes 10 references. (NAL Call No.: DNAL 59.8 C333).

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AGENA. Sweat, V.E. St. Joseph, Mich. : American Society of Agricultural Engineers. Agricultural engineering. Mar 1987. v. 68 (3). p. 8-9. ill. (NAL Call No.: DNAL 58.8 AG83).

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**Food biotechnology /edited by Dietrich Knorr.**

Knorr, Dietrich W. New York : M. Dekker, c1987. xii, 613 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP370.5.F66 1987).

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**Food biotechnology present and future : a study /prepared by the Office of Planning and Evaluation and the Center for Food Safety and Applied Nutrition, Food and Drug Administration.**

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AGENA. Lund, D.B. St. Joseph, Mich. : American Society of Agricultural Engineers. Agricultural engineering. Nov/Dec 1987. v. 68 (7). p. 7-9. ill. (NAL Call No.: DNAL 58.8 AG83).

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**Future food products: what will technology be serving up to consumers in the years ahead.**

QBAOD. Labuza, T.P. York, Pa. : The Association. Quarterly bulletin - Association of Food and Drug Officials. Paper presented at 89th Annual Conference of Association of Food and Drug Officials, Inc., June 19, 1985, Madison, Wisc. Apr 1986. v. 50 (2). p. 67-84. Includes 12 references. (NAL Call No.: DNAL 389.9 AS7Q).

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FOTEA. Welser, J.R. Chicago, Ill. : Institute of Food Technologists. Food technology. Apr 1991. v. 45 (4). p. 102-109. Includes references. (NAL Call No.: DNAL 389.8 F7398).

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**Interdependence of enzymology and agricultural biotechnology.**

ACSMC. Whitaker, J.R. Washington, D.C. : The Society. ACS Symposium series - American Chemical Society. 1989. v. 389. p. 1-9. Includes references. (NAL Call No.: DNAL QD1.A45).

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Oull, R.H. Champaign, Ill. American Oil Chemists' Society, c1988. Proceedings : World Conference on Biotechnology for the Fats and Oils Industry / edited by Thomas H. Applewhite. p. 251-254. (NAL Call No.: DNAL TP248.65.L57W67 1987).

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**Lipid biotechnology: a wonderland for the microbial physiologist.**  
Ratlidge, C. Champaign, Ill. American Oil Chemists' Society, c1988. Proceedings : World Conference on Biotechnology for the Fats and Oils Industry / edited by Thomas H. Applewhite. p. 7-16. Includes references. (NAL Call No.: DNAL TP248.65.L57W67 1987).

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**Lipid biotechnology: a wonderland for the microbial physiologist.**  
JASDH. Ratledge, C. Champaign, Ill. : The Society. Journal of the American Oil Chemists' Society. Dec 1987. v. 64 (12). p. 1647-1656. Includes references. (NAL Call No.: DNAL 307.8 J82).

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BIPRET. Nussinovitch, A. Lee, S.J.; Kaletunc, G.; Peleg, M. New York, N.Y. : American Institute of Chemical Engineers. Biotechnology progress. May/June 1991. v. 7 (3). p. 272-274. Includes references. (NAL Call No.: DNAL TP248.2.B46).

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FOTEA. Whitaker, R.J. Evans, D.A. Chicago, Ill. : Institute of Food Technologists. Abstract: A detailed technical overview discusses the production of flavoring compounds in plants and tissue cultures using biotechnology techniques. Topics include: the metabolic complexity of natural plant products; the chemical complexity of natural flavors; the characteristics, status, and techniques of plant tissue culture biotechnology; potentials for agricultural chemical production; scale-up of cell culture chemical production; the importance of ensuring genetic stability in maintaining plant cell cultures; biotransformation studies using plant cells to economically produce specific chemicals; and technological challenges concerning the scale-up of plant cell cultures. Potential future trends in plant tissue culture biotechnology also are discussed.(wz). Food technology. based on a paper presented during

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**U.S. food trends leading to the year 2000.**  
FOTEA. Sills-Levy, E. Chicago, Ill. : Institute of Food Technologists. Abstract: This article addresses projected food trends in the United States up to the year 2000. Market research looks at the demographic and lifestyle trends which will influence the food industry and food technology in the 21st century. Consumers will want more high-quality foods, more convenience foods, and more nutritious foods. Trends include ethnic foods, microwavable foods, new beverages, changes in food packaging and new products from food biotechnology. Food technology. Paper presented at the "Symposium on Changing Trends in Diet, Nutrition, and Consumer Taste: Implications for Food Technologists," June 19-22, 1988, New Orleans, Louisiana. Apr 1989. v. 43 (4). p. 128, 130-132. charts. Includes 18 references. (NAL Call No.: DNAL 389.8 F7398).

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**Ultrafiltration in food and bioprocessing /presented by Munir Cheryan.**  
Cheryan, Munir. Lancaster, PA : Technomic Pub. Co., between 1986 and 1989. Prepared as an instructional tool for a seminar. 1 v. (various pagings) : ill. ; 30 cm. Includes bibliographical references. (NAL Call No.: DNAL TP248.25.M46C45).



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1261

## **Bovine somatotropin safety and effectiveness: an industry perspective.**

FOTEA. Hecht, D.W. Chicago, Ill. : Institute of Food Technologists. The end goal of technology, when applied to agriculture, is to improve the efficiency of food production or to enhance the quality of our food. That is the goal of bovine somatotropin (BST), one of the first major products of biotechnology being developed for the food industry. This article will discuss (1) how BST came into being and the impact it will have on the food industry; (2) whether it is safe; (3) reasons some people oppose it; (4) regulatory and consumer perception implications; and (5) public benefits. Food technology. Apr 1991. v. 45 (4). p. 118, 123-124, 126. Includes references. (NAL Call No.: DNAL 389.8 F7398).



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JJASDH. Hassanien, F.R. Kukherjee, K.D. Champaign, Ill. : The Society. Journal of the American Oil Chemists' Society. July 1986. v. 63 (7). p. 893-897. Includes 14 references. (NAL Call No.: DNAL 307.8 J82).

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Stumpf, P.K. Champaign, Ill. American Oil Chemists' Society, c1988. Proceedings : World Conference on Biotechnology for the Fats and Oils Industry / edited by Thomas H. Applewhite. p. 1-6. Includes references. (NAL Call No.: DNAL TP248.65.L57W67 1987).

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**Plant lipid biotechnology through the looking glass.**

JJASDH. Stumpf, P.K. Champaign, Ill. : The Society. Journal of the American Oil Chemists' Society. Dec 1987. v. 64 (12). p. 1641-1646. ill. Includes references. (NAL Call No.: DNAL 307.8 J82).

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**Postharvest biotechnology of sugar crops**

/authors, D.K. Salunkhe and B.B. Desai. Salunkhe, D. K. Desai, B. B., 1941-. Boca Raton, Fla. : CRC Press, c1988. 219 p. : ill. ; 27 cm. Includes bibliographies and index. (NAL Call No.: DNAL SB217.S25).

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**Anticipating the impacts of biotechnology on agriculture: a review and synthesis.**  
ACSMC. Molnar, J.J. Kinnucan, H.; Hatch, U.  
Washington, D.C. : The Society. ACS Symposium  
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**Biosafety and biotechnology.**  
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Microbiology. 1986. Manual of industrial  
microbiology and biotechnology / editors,  
Arnold L. Demain and Nadine A. Solomon. p.  
402-409. Includes references. (NAL Call No.:  
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**Biotechnology--a means for improving our food supply.**  
FOTEA. Harlander, S.K. Chicago, Ill. :  
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variety, productivity, and efficiency of food  
production. Under the umbrella of  
"biotechnology," a number of different  
technologies allow researchers to target the  
genetic manipulation of plants, animals, and  
microorganisms and to do so in less time and  
with greater precision, predictability, and  
control than possible with traditional methods.  
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**Biotechnology and food: a social appraisal.**  
Burkhardt, J. Busch, L.; Lacy, W.B.; Hansen, M.  
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**Biotechnology and food processing.**  
Harlander, S. Lexington : Kentucky Agricultural  
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**Biotechnology: applications of genetics to food production.**  
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**BIOTECHNOLOGY: Consumer concerns about risks and values.**  
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that the new food technologies now under  
development promise many benefits with few  
consequential risks associated with problems of  
food spoilage or adulteration, such as  
Salmonella poisoning, and note that we now have  
the safest, most secure food supply in the  
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**Biotechnology: emerging and expanding opportunities for the food industry.**

NTDYA. Harlander, S.K. Baltimore, Md. : Williams & Wilkins. Abstract: A technical report discusses the perceived direct/indirect effects that biotechnology will have on human nutrition from its applications in agriculture and in the food fermentation and processing industries. Specific attention is focused on: principles and applications of genetic engineering and plant biotechnology (crop improvements); the use of plant tissue culture for producing food ingredients ("natural" flavors); food processing applications (genetic modification of microorganisms used in food processing); reduction of food processing wastes; and food safety considerations. The use of biosensors for assuring food quality, and the US federal regulation and public perception of biotechnology also are discussed.(wz). Nutrition today. Aug 1987. v. 22 (4). p. 21-29. ill., charts. Includes 22 references. (NAL Call No.: DNAL FNC RA784.N8).

1279

**Biotechnology, food, nutrition and public health: a natural linkage.**

Kinsella, J.E. Stoneham, MA : Butterworth, 1986. BIO EXP0 86 : proceedings, April 29-May 1, 1986, Boston, MA / organized and presented by Cahners Exposition Group. p. 183-191. (NAL Call No.: DNAL TP248.2.B5 1986).

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**Biotechnology in food science & technology, 1981-1986.**

Whitmore, S.C. Larson, J.A. Beltsville, Md. : The Library. Quick bibliography series - National Agricultural Library (U.S.). Bibliography. Mar 1986. (87-29). 32 p. (NAL Call No.: DNAL aZ5071.N3).

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**Biotechnology in food science and technology, January 1987-March 1991.**

Warmbrodt, R.D. Beltsville, Md. : The Library. Quick bibliography series - U.S. Department of Agriculture, National Agricultural Library (U.S.). Updates QB 87-29.~ Bibliography. May 1991. (91-98). 64 p. (NAL Call No.: DNAL aZ5071.N3).

1282

**Biotechnology merges into Japanese food industry.**

FOTEA. Hayashi, T. Chicago, Ill. : Institute of Food Technologists. Abstract: A brief review examines how and why Japan's initial interest in biotechnology has grown to its current state of research in several areas of the food

industry. Factors that have favorably influenced the acceptance of biotechnology into Japan's food industry are discussed. Four specific areas in which the Japanese food industry is active in biotechnology are described, viz.: pharmaceuticals (a diversifying area for many Japanese food companies); health-care and health food products; food additives and new foods; and agricultural and fishery-related products. The proclaimed unwarranted anxiety over the safety of single-cell protein production also is discussed.(wz). Food technology. Oct 1986. v. 40 (10). p. 67-69. (NAL Call No.: DNAL 389.8 F7398).

1283

**Biotechnology promises novel raw materials, new ingredients, control of food toxicants.**

McCormick, R.D. Chicago, Ill. : Gorman Publishing Company. Abstract: The progress and utility of biotechnology in the processed food industry is reviewed. This new technology is being applied to create superior foods and food processes, and offers opportunities for the development of normal raw food materials and ingredients and for the control of food toxicants. Using basic cell culture techniques, biotechnology and genetic engineering has the promise of creating new food materials in virtually all food classes. Examples of applications include microorganism modifications to improve fermentation and produce a variety of flavoring compounds, the reduction of bitterness in citrus fruit juices, and the production of food coloring agents. Among the more exciting applications has been the development of DNA probes and monoclonal antibodies for detecting and monitoring the presence of specific organisms such as Salmonella. Several other applications are cited and the potential regulation of biotechnology products is discussed.(wz). Prepared foods. Jan 1986. v. 155 (1). p. 131-132. ill. (NAL Call No.: DNAL HD9000.1.F646).

1284

**Biotechnology rapidly changing production and content of foods.**

Barber, F. Durham, N.C. : Durham Herald Co., Inc. The Herald-sun. Oct 10, 1988. p. A8. (NAL Call No.: DNAL A00063).

1285

**Biotechnology: single cell protein, 1979-85.**

Bellows, J.L. Whitmore, S. Beltsville, Md. : The Library. Quick bibliography series - National Agricultural Library (U.S.). Bibliography. Apr 1986. (86-53). 29 p. (NAL Call No.: DNAL aZ5071.N3).



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1286

### **Commercial opportunities in plant biotechnology for the food industry.**

FOTEA, Kunimoto, L. Chicago, Ill. : Institute of Food Technologists. Abstract: A technical overview briefly discusses and pictorially illustrates the basic techniques of control of genetic engineering of plants, and describes 3 projects portraying the application of this technology in the food industry. The objectives of the 3 projects are: the engineering of tomato fruit for increased density and firmness retention; the reduction or elimination of a chemical in tobacco; and alteration of the chemical composition of vegetable oil in oil seed crops, and increasing the amount of stored oil at the expense of protein and fiber. The economic benefits of these objectives are discussed.(wz). Food technology. Oct 1986. v. 40 (10). p. 58-60. ill. Includes 2 references. (NAL Call No.: DNAL 389.8 F7398).

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### **Cost estimation for biotechnology projects.**

Kalk, J.P. Langlykke, A.F. Washington, D.C. : American Society for Microbiology, 1986. Manual of industrial microbiology and biotechnology / editors, Arnold L. Demain and Nadine A. Solomon. p. 363-385. ill. Includes references. (NAL Call No.: DNAL QR53.M27).

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### **Enzyme and whole cell production of flavor and fragrance compounds.**

ANYAA9. Williams, R.E. Armstrong, D.W.; Murray, W.D. New York, N.Y. : The Academy. Annals of the New York Academy of Sciences. In the series analytic: Enzyme engineering 9 / edited by H.V. Blanch and A.M. Klibanov. 1988. v. 542. p. 406-412. Includes references. (NAL Call No.: DNAL 500 N484).

1289

### **Establishment of pilot plant.**

Hamilton, B.K. Schruben, J.U.; Montgomery, J.P. Washington, D.C. : American Society for Microbiology, 1986. Manual of industrial microbiology and biotechnology / editors, Arnold L. Demain and Nadine A. Solomon. p. 321-344. Includes references. (NAL Call No.: DNAL QR53.M27).

1290

### **Evaluation of biotech-derived foods.**

AGEREH. New York, N.Y. : Mary Ann Liebert. Agricultural genetics report. June 1990. v. 9 (3). p. 6. (NAL Call No.: DNAL QH442.A47).

1291

### **FDA regulation of food ingredients produced by biotechnology.**

FOTEA, Korwek, E.L. Chicago, Ill. : Institute of Food Technologists. Abstract: A legalistic overview discusses FDA regulations of food ingredients prepared by biotechnological methods, and statutes enforced by other regulatory bodies as they apply to food applications of modern biotechnology. Specific attention is given to FDA regulations of food additives and of GRAS ("generally recognized as safe") substances. Methods for establishing GRAS status are discussed, and the use of biotechnological methods for preparing substances that have been affirmed as GRAS is described. Regulatory considerations for biotechnology applications in foods controlled by USDA and EPA also are discussed.(wz). Food technology. Oct 1986. v. 40 (10). p. 70, 72, 74. Includes 26 references. (NAL Call No.: DNAL 389.8 F7398).

1292

### **Federal regulation of food biotechnology.**

Ronk, R. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 29-35. (NAL Call No.: DNAL TP248.2.B5537).

1293

### **Fermentation systems and processes.**

Bjurstrom, E.E. New York : M. Dekker, c1987. Food biotechnology / edited by Dietrich Knorr. p. 193-222. ill. Includes references. (NAL Call No.: DNAL TP370.5.F66 1987).

1294

### **Fermentations.**

YAXAA. McKay, L.L. Washington, D.C. : U.S. Department of Agriculture. The Yearbook of agriculture. 1986. p. 56-59. ill. (NAL Call No.: DNAL 1 AG84Y).

1295

### **Food biotechnology /edited by Dietrich Knorr.**

Knorr, Dietrich W. New York : M. Dekker, c1987. xii, 613 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP370.5.F66 1987).

1296

**Food biotechnology: its organization and potential.**

FOTEA. Knorr, D. Chicago, Ill. : Institute of Food Technologists. Abstract: Following a brief historical review of food biotechnology (from fermentation to metabolic and genetic engineering), attention is focused on discussions of 3 different approaches to describing the organization of food biotechnology, viz.: (1) a product-oriented approach (dividing plant and animal foods into products produced by microbial, plant, or enzyme/whole cell processes); (2) a system-oriented approach (based on 5 categories of food production and processing); and (3) a unit operations approach (organizing the 150-175 unit operations used in food processing into the 3 categories of separation, preservation, and assembly). Current research needs in food biotechnology and a number of specific challenges that must be met (regulatory; investment; quality control) also are discussed.(wz). Food technology. Apr 1987. v. 41 (4). p. 95-100. charts. Includes 100 references. (NAL Call No.: DNAL 389.8 F7398).

1297

**Food biotechnology review: traditional solid-state fermentations of plant raw materials--application, nutritional significance, and future prospects.**

CRFND. Paredes-Lopez, O. Harry, G.I. Boca Raton, Fla. : CRC Press. Abstract: Solid state fermentation is defined as the growth of microorganisms on solid materials without the presence of free liquid. This review covers the fermentation of plant derived solids to produce foods for human consumption. Critical reviews in food science and nutrition. Literature review. 1988. v. 27 (3). p. 159-187. charts. Includes 67 references. (NAL Call No.: DNAL TP368.C7).

1298

**Food biotechnology: yesterday, today, and tomorrow.**

FOTEA. Harlander, S. Chicago, Ill. : Institute of Food Technologists. Abstract: This article discusses food biotechnology and its impact on future agriculture and food products. Topics discussed are custom-designed crops, enzyme engineering, microbial production of food ingredients and health related topics. Food technology. Sept 1989. v. 43 (9). p. 196-202. 206. ill., charts. Includes 20 references. (NAL Call No.: DNAL 389.8 F7398).

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**Food fermentation with molds.**

Buchanan, R. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 209-221. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

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**Food for thought.**

Hiebert, H. Saranac Lake, N.Y. : American Management Association. Management review. June 1991. v. 80 (6). p. 31-32. (NAL Call No.: DNAL 280.8 M312).

1301

**Food processors seek to adapt bioproducts for large-scale manufacturing.**

Glaser, V. Dutton, G. New York, N.Y. : Mary Ann Liebert. Genetic engineering news. Feb 1992. v. 12 (2). p. 6, 8. (NAL Call No.: DNAL QH442.G456).

1302

**Food protection technology / edited by Charles W. Felix.**

Felix, Charles W. Chelsea, MI : Lewis Publishers, c1987. Abstract: A reference text for US federal, state, and local environmental health officials concerned with food safety and for their US food industry counterparts presents the proceedings of the 1986 Conference for Food Protection. The text includes 36 technical papers grouped among 6 specific areas of food safety, viz.: toxicology; microbiology; good manufacturing practice regulations and guidelines, including quality control and quality assurance concepts; consumer education on food and nutrition; and the processing and packaging of new foods and new processing technologies (e.g.: genetic engineering, food-packaging interactions, irradiation processing, aseptic packaging, biotechnology). Specific recommendations by committees representing each of these 6 areas are included. Papers presented at the Third Conference for Food Protection, Ann Arbor, Mich., Aug. 17-20, 1986. xx, 418 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TX511.F57).

1303

**Foods experimental perspectives /Margaret McWilliams.**

McWilliams, Margaret. New York : Macmillan, c1989. Abstract: This textbook provides a detailed, scientific analysis of the composition and preparation of food and commercial food products. The information presented covers a broad range of scientific data and the author assumes readers will have



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some background in physical and biological sciences (i.e. physics and organic chemistry). Topics include: food research, physical foundations of food science, the chemistry of food components, food preservation, and food additives. Includes bibliographies. A laboratory manual to accompany the textbook entitled "Experimental Foods: Laboratory Manual" is available. xxii, 584 p. : ill. : 26 cm. Includes bibliographies and index. (NAL Call No.: DNAL TX531.M5).

1304

**The future of biotechnology in food processing.** YAXAA. Harlander, S.K. Garner, R.G. Washington, D.C. : U.S. Department of Agriculture. The Yearbook of agriculture. 1986. p. 52-55. ill. (NAL Call No.: DNAL 1 AG84Y).

1305

**Genetic engineering and process development for production of food processing enzymes and additives.** FDTEA. Lin, Y.L. Chicago, Ill. : Institute of Food Technologists. Abstract: Recent advances in the biotechnology and processing technology for producing food processing enzymes and additives are reviewed and discussed. Attention is given to: techniques for the overproduction of food processing enzymes and additives involving endogenous and exogenous products; different strategies for stabilizing the plasmid inside the cells during propagation; the genetic engineering of the amino acid sequence of a protein; process development technology; and optimization of fermentation conditions. The unit operations for production of recombinant enzymes and additives are discussed and illustrated.(wz). Food technology. Oct 1986. v. 40 (10). p. 104-112. ill., charts. Includes 54 references. (NAL Call No.: DNAL 389.8 F7398).

1306

**Genetic engineering of extracellular enzyme systems of Bacilli.** ANYAA9. McConnell, D.J. Cantwell, B.A.; Devine, K.M.; Forage, A.J.; Laoide, B.M.; D'Kane, C.; Dillington, J.F.; Sharp, P.M. New York, N.Y. : The Academy. Annals of the New York Academy of Sciences. Presented at the Fourth International Conference on Biochemical Engineering, October 1-5, 1984, Galway, Ireland. May 22, 1986. v. 469. p. 1-17. Includes references. (NAL Call No.: DNAL 500 N484).

1307

**Gluconic acid production by an immobilized glucose oxidase reactor with electrochemical regeneration of an artificial electron acceptor.** BIBIAU. Bourdillon, C. Lortie, R.; Laval, J.M. New York, N.Y. : John Wiley & Sons. Biotechnology and bioengineering. Apr 20, 1988. v. 31 (6). p. 553-558. ill. Includes references. (NAL Call No.: DNAL 381 J8224).

1308

**Grooming microbes for future 'factory' toil.** AGENA. St. Joseph, Mich. : American Society of Agricultural Engineers. Agricultural engineering. Nov/Dec 1986. v. 67 (7). p. 31. (NAL Call No.: DNAL 58.8 AG83).

1309

**Immobilization of beta-galactosidase in porous supports.** ANYAA9. Prenosil, J.E. Pedersen, H. New York, N.Y. : The Academy. Annals of the New York Academy of Sciences. Presented at the Fourth International Conference on Biochemical Engineering, October 1-5, 1984, Galway, Ireland. May 22, 1986. v. 469. p. 289-293. Includes references. (NAL Call No.: DNAL 500 N484).

1310

**Impact of biotechnology on food and nutrition.** Ruttloff, H. New York : M. Dekker, c1987. Food biotechnology / edited by Dietrich Knorr. p. 37-94. Includes references. (NAL Call No.: DNAL TP370.5.F66 1987).

1311

**Impact of biotechnology on the food industries.** Roels, J.A. Thijssen, H.A.C. New York : M. Dekker, c1987. Food biotechnology / edited by Dietrich Knorr. p. 21-35. Includes references. (NAL Call No.: DNAL TP370.5.F66 1987).

1312

**Impact of biotechnology on the nutritional quality of foods.** Teutonico, R.A. New York : M. Dekker, c1987. Food biotechnology / edited by Dietrich Knorr. p. 95-135. Includes references. (NAL Call No.: DNAL TP370.5.F66 1987).

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1313

**An industrial perspective on biotechnology issues.**  
FOTEA. Welser, J.R. Chicago, Ill. : Institute of Food Technologists. Food technology. Apr 1991. v. 45 (4). p. 102-109. Includes references. (NAL Call No.: DNAL 389.8 F7398).

1314

**Inoculum development.**  
Hunt, G.R. Stieber, R.W. Washington, D.C. : American Society for Microbiology, 1986. Manual of industrial microbiology and biotechnology / editors, Arnold L. Demain and Nadine A. Solomon. p. 31-39. Includes references. (NAL Call No.: DNAL QR53.M27).

1315

**Introduction to biotechnology.**  
FOTEA. Harlander, S. Chicago, Ill. : Institute of Food Technologists. Abstract: Biotechnology is a tool which is being used to improve our agricultural and food processing systems. This introductory article discusses some techniques and applications of biotechnology to agriculture and food science. These techniques include enzyme and protein engineering, cell and enzyme immobilization, fermentation technology, biosensors, and plant and animal cell tissue culture. Food technology. Paper presented at the symposium, "Maintaining the Competitive Edge in Food Biotechnology: Prospects and Challenges," April 3-4, 1989, Arlington, Virginia. July 1989. v. 43 (7). p. 44, 46, 48. (NAL Call No.: DNAL 389.8 F7398).

1316

**Isolation and purification of a mold alpha-Galactosidase.**  
JABID. Zaprometova, O.M. Ulezlo, I.V. Duluth, Minn. : Academic Press. Biotechnology and applied biochemistry. June 1988. v. 10 (3). p. 233-246. Includes references. (NAL Call No.: DNAL QD415.A1J63).

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**Java gene jockeys.**  
AGEREH. New York, N.Y. : Mary Ann Liebert. Agricultural genetics report. 1990. v. 9 (4). p. 5-6. (NAL Call No.: DNAL QH442.A47).

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**Lactobacilli in food fermentations.**  
Chassy, B. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 197-207. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

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**Legal protection for biotechnology.**  
Saliwanchik, R. Washington, D.C. : American Society for Microbiology, 1986. Manual of industrial microbiology and biotechnology / editors, Arnold L. Demain and Nadine A. Solomon. p. 389-401. Includes references. (NAL Call No.: DNAL QR53.M27).

1320

**Methods and applications of molecular cloning.**  
Bhaduri, S. New York : M. Dekker, c1987. Food biotechnology / edited by Dietrich Knorr. p. 139-161. ill. Includes references. (NAL Call No.: DNAL TP370.5.F66 1987).

1321

**Methods of cell immobilization.**  
Chibata, I. Tosa, T.; Sato, T. Washington, D.C. : American Society for Microbiology, 1986. Manual of industrial microbiology and biotechnology / editors, Arnold L. Demain and Nadine A. Solomon. p. 217-229. ill. Includes references. (NAL Call No.: DNAL QR53.M27).

1322

**Mixed cultures in biotechnology / edited by J. Gregory Zeikus, Eric A. Johnson.**  
Zeikus, J. Gregory, 1945-; Johnson, Eric A., 1956-. New York : McGraw-Hill, c1991. ix, 438 p. : ill. ; 24 cm. Includes bibliographical references and index. (NAL Call No.: DNAL TP248.25.M58M5).

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**Model for calculating the compressive deformability of double-layered curdian gels.**  
BIPRET. Nussinovitch, A. Lee, S.J.; Kaletunc, G.; Peleg, M. New York, N.Y. : American Institute of Chemical Engineers. Biotechnology progress. May/June 1991. v. 7 (3). p. 272-274. Includes references. (NAL Call No.: DNAL TP248.2.B46).

1324

**Natural gum finds many uses.**  
AGREA. Kinzel, B. Washington, D.C. : The Service. Agricultural research - U.S. Department of Agriculture, Agricultural Research Service. Mar 1990. v. 38 (3). p. 22. ill. (NAL Call No.: DNAL 1.98 AG84).



1325

**New applications of biotechnology in the food industry.**

CFWOD. Lawrence, R.H. Jr. St. Paul, Minn. : American Association of Cereal Chemists. Abstract: New applications of food biotechnology are reviewed as follows: enzymes in processing of dairy foods; gene transfer systems in fermenting wine and beer; improved functionality of agricultural raw materials, industrial microbes, and plant cell bioreactors for ingredient production. It is concluded that as food companies become more familiar with the technology and begin to experience its success in the market place, internalization of research skills and the full integration of biotechnology into a well established food research discipline will be seen. Cereal foods world. Based on a paper presented at the Annual Symposium sponsored by the Food and Nutrition Board, Commission on Life Sciences, National Research Council, Dec. 1, 1986, Washington, D.C.~ Literature review. Oct 1987. v. 32 (10). p. 758-765. ill. Includes 79 references. (NAL Call No.: DNAL 59.8 C333).

1326

**Pediococci and biotechnology.**

CRVMA. Raccach, M. Boca Raton, Fla. : CRC Press. Critical reviews in microbiology. Literature review. 1987. v. 14 (4). p. 291-309. Includes references. (NAL Call No.: DNAL QR1.C7).

1327

**Perspective on food biotechnology.**

FDACB. Miller, H.I. Ackerman, S.J. Rockville, Md. : Food and Drug Administration, Department of Health & Human Services. The new biotechnology, less than 20 years old, is already changing the foods we eat. This article discusses what is new in the biotechnology field. The benefits and controversies concerning the new techniques are also discussed. F.D.A. consumer. Mar 1990. v. 24 (2). p. 8-13. (NAL Call No.: DNAL FNC HD9000.9.U5A1).

1328

**Production of flavor and aroma compounds by biotechnology.**

FOTEA. Gatfield, I.L. Chicago, Ill. : Institute of Food Technologists. Abstract: Flavor and aroma compounds produced by microbial fermentation and enzymes are discussed. Food technology. Oct 1988. v. 42 (10). p. 110, 111-118, 120-122, 169. charts. Includes references. (NAL Call No.: DNAL 389.8 F7398).

1329

**Profit opportunities in biotechnology for the food processing industry.**

Newell, N. Gordon, S. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 297-311. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

1330

**Promising new markets emerging for commercial enzymes.**

CENEAR. Layman, P. Washington, D.C. : American Chemical Society. Chemical and engineering news. Sept 24, 1990. v. 68 (39). p. 17-18. (NAL Call No.: DNAL 381 J825N).

1331

**Protein engineering: potential applications in food processing.**

Wetzel, R. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 57-71. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

1332

**Proteolytic enzymes: Sources and applications.**

FOTEA. Loffler, A. Chicago, Ill. : Institute of Food Technologists. Abstract: Current applications of protease enzymes in food and other biotechnological industries are reviewed and some of the conventional and more innovative, suitable sources for extraction of proteases are reviewed. Topics include: properties, applications, and advantages of proteolytic enzymes for clearing proteins into small peptides and amino acids; some of the uses of various proteolytic enzyme sources in the food and food-related industries; the development/isolation of such enzymes from synthesis or from plant, animal, and microbial sources; and the development of new sources by recombinant DNA technology and their benefits to the food industry. Information on the classification of proteases on the basis of their sensitivity to specific inhibitors, of microbial proteases on the basis of their specificity, and on specific applications of proteases in food and food-related industries, is included.(wz). Food technology. Jan 1986. v. 40 (12). p. 63-70. charts. Includes 60 references. (NAL Call No.: DNAL 389.8 F7398).

1333

**PUBLIC COMMUNICATIONS: Genetically improved food crops.**

FOTEA. Ingenthron, G.D. Chicago, Ill. : Institute of Food Technologists. This article will address subjects related to public communications on genetically engineered food

crops. It will discuss various findings of related public opinion polls on food and give some critics' positions on biotechnology. Concluding the article are recommendations for a broad approach for communicating on biotechnology-related issues. Food technology. Apr 1991. v. 45 (4). p. 110, 112, 114, 117. Includes references. (NAL Call No.: DNAL 389.8 F7398).

1334

**Recombinant DNA technology for *Corynebacterium glutamicum*.**  
FOTEA, Follettie, M.T. Sinskey, A.J. Chicago, Ill. : Institute of Food Technologists.  
Abstract: A technical review summarizes and discusses work by the authors in the development of genetic tools for molecular cloning of amino acid biosynthetic genes from the non-pathogenic microorganism, *Corynebacterium glutamicum*. This microorganism has been used in the industrial biosynthesis of various amino acids and flavor-enhancing nucleotides. The specific isolation of amino acid biosynthetic genes from *C. glutamicum* and of its genes from *E. coli* is detailed and illustrated. The technological goals of increasing the quantity and "quality" of existing genes, and of introducing novel genes or biosynthetic pathways into an organism are discussed.(wz). Food technology. Oct 1986. v. 40 (10). p. 88, 90-94. ill., charts. Includes 24 references. (NAL Call No.: DNAL 389.8 F7398).

1335

**Regulatory aspects of the use of modern biotechnological methods in the food industry.**  
Korwek, E.L. New York : M. Dekker, c1987. Food biotechnology / edited by Dietrich Knorr. p. 559-574. Includes references. (NAL Call No.: DNAL TP370.5.F66 1987).

1336

**Regulatory issues in the food biotechnology arena.**  
McNamara, S. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 15-27. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

1337

**Single cell protein: January 1984-September 1990.**  
Larson, J.A. Beltsville, Md. : The Library. Quick bibliography series - U.S. Department of Agriculture, National Agricultural Library (U.S.). Updates QB 86-53.- Bibliography. Dec 1990. (91-38). 30 p. ill. (NAL Call No.: DNAL aZ5071.N3).

1338

**Strategies for commercialization of biotechnology in the food industry.**  
Wheat, D. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 279-284. (NAL Call No.: DNAL TP248.2.B5537).

1339

**Sustaining the food supply.**  
Fraley, R. New York, N.Y. : Nature Publishing Company. Bio/technology. Jan 1992. v. 10 (1). p. 40-43. Includes references. (NAL Call No.: DNAL QH442.B5).

1340

**Unitization of fermented foods: an application of fermentation technology.**  
Sfat, M. Park Ridge, N.J. : Noyes Publications, c1986. Biotechnology in food processing / edited by Susan K. Harlander and Theodore P. Labuza. p. 223-236. Includes references. (NAL Call No.: DNAL TP248.2.B5537).

1341

**Using biotechnology in food processing today.**  
YAXAA. Lund, D.B. Washington, D.C. : U.S. Department of Agriculture. The Yearbook of agriculture. 1986. p. 48-51. ill. (NAL Call No.: DNAL 1 AG84Y).

1342

**Yeast biotechnology in the food and beverage industries.**  
CFWOD. Stewart, G.G. Russell, I. St. Paul, Minn. : American Association of Cereal Chemists. Abstract: The genetic engineering industry has found yeast to be an ideal host in which to express genes of interest. In view of this, techniques for manipulating industrial strains of *Saccharomyces* are discussed: hybridization, rare mating, mutation and selection and recombinant DNA technology. These methods are used in the production of food products such as cheese, bread, alcoholic beverages, and Oriental fermented foods. Cereal foods world. Oct 1987. v. 32 (10). p. 766-769. ill. Includes 20 references. (NAL Call No.: DNAL 59.8 C333).

1343

**2001 Agriculture: Meals for the millennium. 3.**  
Londer, R. Los Angeles, Calif. : Time, Inc. Discover. Nov 1988. v. 9 (11). p. 60-63. (NAL Call No.: DNAL Q1.D57).

# MICROBIOLOGY, DAIRY

1344

**Biotechnology's cash cow.**

NYTIA0. Schneider, K. New York, N.Y. : H.J. Raymond & Co. . The New York times. June 12, 1988. p. 44, 46-47, 52-53. (NAL Call No.: DNAL 286.8 N488).

1345

**How FDA approved chymosin: a case history.**

Flamm, E.L. New York, N.Y. : Nature Publishing Company. Bio/technology. Apr 1991. v. 9 (4). p. 349-351. Includes references. (NAL Call No.: DNAL QH442.B5).

1346

**Novel method of lactic acid production by electrodialysis fermentation.**

APMBA. Hongo, M. Nomura, Y.; Iwahara, M. Washington, D.C. : American Society for Microbiology. Applied and environmental microbiology. Aug 1986. v. 52 (2). p. 314-319. ill. Includes 25 references. (NAL Call No.: DNAL 448.3 AP5).

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**Proceedings World Conference on Biotechnology for the Fats and Oils Industry /edited by Thomas H. Applewhite.**

Applewhite, Thomas H. Champaign, Ill. : American Oil Chemists' Society, c1988. Spine title: World Conference on Biotechnology for the Fats and Oils Industry. vi, 363 p. : ill. ; 29 cm. Includes bibliographical references. (NAL Call No.: DNAL TP248.65.L57W67 1987).

1348

**The use of recombinant DNA techniques to improve lactic acid starter cultures.**

Batt, C.A. Stoneham, MA : Butterworth, 1986. BIO EXPO 86 : proceedings, April 29-May 1, 1986, Boston, MA / organized and presented by Cahners Exposition Group. p. 151-170. Includes references. (NAL Call No.: DNAL TP248.2.B5 1986).



# MICROBIOLOGY, FIELD CROP

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**Bioreactor operating strategies for microbial lipids from carbohydrates.**

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DIMCA. Stewart, G.G. Arlington, Va. : Society for Industrial Microbiology. Developments in industrial microbiology. 1988. v. 29. p. 1-21. ill. Includes references. (NAL Call No.: DNAL 448.3 D49).

1872

**Training expected for future public plant breeders.**

Forsberg, R.A. Madison, Wis. : American Society of Agronomy. Journal of agronomic education. Fall 1990. v. 19 (2). p. 200-202. Includes references. (NAL Call No.: DNAL S530.J6).

1873

**Transgenic technologiesBioConferences International, Inc.**

Potomac, MD : BioConferences International, 1991. Panel discussion on transgenics and how they can be applied to biotechnology, development studies on mice using transgenics; immunological developments using transgenics; transgenic pigs; and transgenics and fish. Videorecording of session at BioEast'91 held in Washington, DC, Jan 6-9, 1991, sponsored by BioConferences International, Inc., Genetic Engineering News, IBEX; co-sponsored by the Pennsylvania State University Biotechnology and Bioprocessing Resource Center. 1 videocassette (113 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.1143).

1874

**Transnational corporations in biotechnology /United Nations Centre on Transnational Corporations.**

New York : United Nations, 1988. "ST/CTC/61.". viii, 136 p. : 28 cm. Includes bibliographies. (NAL Call No.: DNAL HD9999.B442T72).

1875

**U.S. biotechnology legislative and regulatory roadmap.**

Washington, D.C. : Special Projects Unit of the Bureau of National Affairs, c1989. Cover title. 1 v. (various pagings) : ill. ; 28 cm. (NAL Call No.: DNAL KF1893.B56U2).

1876

**Ultrafiltration in food and bioprocessing /presented by Munir Cheryan.**

Cheryan, Munir. Lancaster, PA : Technomic Pub. Co., between 1986 and 1989. Prepared as an instructional tool for a seminar. 1 v. (various pagings) : ill. ; 30 cm. Includes bibliographical references. (NAL Call No.: DNAL TP248.25.M46C45).

1877

**Understanding the impacts of biotechnology.**

PHYTA. Fulkerson, J.F. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Presented at the "Symposium on Assessing the Socioeconomic, Ecological, and Scientific Effects of Agricultural Biotechnology," November 16, 1988, San Diego, California. Mar 1991. v. 81 (3). p. 343. (NAL Call No.: DNAL 464.8 P56).



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1878

**University-based forest biotechnology research programs survey results /conducted by the American Forest Council.**

Washington, D.C.? : The Council?, 1987? .  
Title on p. i : University-based forest biotechnology research program summary.~ Cover title. 33 leaves ; 28 cm. (NAL Call No.: DNAL SD356.5.U55).

1879

**Upstream processes equipment and techniques /editor, Avshalom Mizrahi.**

Mizrahi, A. New York : Liss, c1988. xi, 241 p. : ill. ; 24 cm. Includes bibliographical references and index. (NAL Call No.: DNAL TP248.13.A38 v.7).

1880

**The use and regulation of biotechnology in agriculture joint hearing before the Committee on Agriculture, Nutrition, and Forestry and the Subcommittee on Technology and the Law of the Committee on the Judiciary, United States Senate, One Hundredth Congress, first session, on the potential of biotechnology and America's competitive position, November 4, 1987.**

United States.~Congress.~Senate.~Committee on Agriculture, Nutrition, and Forestry.  
Washington, D.C. : U.S. G.P.O. : For sale by the Supt. of Docs., Congressional Sales Office, U.S. G.P.O., 1988. Distributed to some depository libraries in microfiche. iv, 113 p. : ill. ; 24 cm. (NAL Call No.: DNAL KF26.A35 1987g).

1881

**The use of hematologic parameters in applying the principles of toxicity testing to biotechnology products.**

Payne, B.J. New York : A.R. Liss, c1987.  
Preclinical safety of biotechnology products intended for human use : proc of the satellite symposium to the IV Int Congress of Toxicology, Keio Plaza Hotel, Tokyo, Japan, July 26, 1986 / editor, Charles E. Graham. p. 107-120. Includes references. (NAL Call No.: DNAL TP248.14.P74).

1882

**Use of PCR in testing for viruses BioConferences International, Inc.**

Potomac, MD : BioConferences International, 1991. Panel discussion of PCR (polymerase chain reaction, a technique which can amplify amounts of DNA), its use in the detection of viral decontaminants in biologies, in testing for retroviruses, mutations, and other human virus forms; and its use in tests for cytomegalovirus. Videorecording of session at BioEast '91 held in Washington, D.C., Jan 6-9, 1991, sponsored by BioConferences

International, Inc., Genetic Engineering News, IBEX; co-sponsored by the Pennsylvania State University Biotechnology and Bioprocessing Resource Center. 1 videocassette (115 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.1144).

1883

**Web of lifeco-production of WETA-TV and Smithsonian.**

Washington, D.C. : WETA, c1989. VHS format.~ Container label has 1987 copyright. 1 videocassette (57 min., 50 sec.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.435).

1884

**White House says recombinant organisms pose no unusual risks to the environment.**

Eisner, R. New York, N.Y. : Mary Ann Liebert. Genetic engineering news. Mar 15, 1992. v. 12 (4). p. 1, 15. (NAL Call No.: DNAL QH442.G456).

1885

**Who wins and who loses from agriculture and food biotechnology some policy implications /Ronald D. Knutson.**

Knutson, Ronald D. College Station : Agricultural and Food Policy Center, Dept. of Agricultural Economics, Texas Agricultural Experiment Station, Texas Agricultural Extension Service, Texas A&M University, 1988. "May 1988.". 11 leaves ; 28 cm. Bibliography: leaf 11. (NAL Call No.: DNAL HD1751.A4 no.88-7).

1886

**Why do we need biotechnology?.**

Marshall, W.E. Lexington : Kentucky Agricultural Experiment Station, 1988. Biotechnology and agricultural cooperatives : opportunities and challenges / edited by William B. Lacy and Lawrence Busch. p. 1-7. (NAL Call No.: DNAL S494.5.B563859).

1887

**Yeast biotechnology and biocatalysis /edited by Hubert Verachtert, Rene De Mot.**

Verachtert, Hubert, 1932-; Mot, Rene de, 1957-. New York : M. Dekker, c1990. xv, 522 p. : ill. ; 23 cm. Includes bibliographical references. (NAL Call No.: DNAL TP248.2.B463 v.5).

1888

**The yeast killer toxin expression system: functional analysis and biotechnological applications.**

Thomas, D.Y. Vernet, T.; Boone, C.; Greene, D.; Lolle, S.; Bussey, H. Boca Raton, Fla. : CRC Press, c1987. Biological research on industrial yeasts / editors, Graham G. Stewart ... et al. . "Symposium on the Biochemistry and Molecular Biology of Industrial Yeasts, Brook Lodge, Kalamazoo, Mich., October 25 to 30, 1985, sponsored jointly by the Upjohn Company, Kalamazoo and Labatt Brewing Company, Ltd., London, Ontario, Canada." v. 1 p. 155-163. Includes references. (NAL Call No.: DNAL QR151.B565).

1889

**Yeast systems for the commercial production of heterologous proteins.**

Buckholz, R.G. Gleeson, M.A.G. New York, N.Y. : Nature Publishing Company. Bio/technology. Literature review. Nov 1991. v. 9 (11). p. 1067-1072. Includes references. (NAL Call No.: DNAL QH442.B5).

1890

**Yeast technology /Gerald Reed, Tilak W. Nagodawithana.**

Reed, Gerald. Nagodawithana, Tilak W. New York : Van Nostrand Reinhold, c1991. Abstract: This second edition is completely revised examining today's industrial uses of yeast, emphasizing microbiological aspects. This book features the latest advances in genetic modification of industrial yeasts and information on recent developments in wine making, brewing, and baking, including discussions on yeast derivatives and yeast biotechnology. The text will supply essential information to food technologists, researchers, plant managers, and sales personnel, as well as chemists, geneticists, microbiologists and engineers in the industry. "An AVI book." ix, 454 p. : ill. ; 24 cm. Includes bibliographical references and index. (NAL Call No.: DNAL TP460.R4 1991).

1891

**Yeasts in biotechnology.**

Fogel, S. Welch, J.W. Boca Raton, Fla. : CRC Press, c1987. Biological research on industrial yeasts / editors, Graham G. Stewart ... et al. . "Symposium on the Biochemistry and Molecular Biology of Industrial Yeasts, Brook Lodge, Kalamazoo, Mich., October 25 to 30, 1985, sponsored jointly by the Upjohn Company, Kalamazoo and Labatt Brewing Company, Ltd., London, Ontario, Canada." v. 1 p. 99-110. ill. Includes references. (NAL Call No.: DNAL QR151.B565).

1892

**1988 Conference on Commercial Biotechnology focusing on the supplier-user interface--making biotechnology's potential happen through new and better support products /presented by Business Communications Company, Inc.**

Norwalk, Conn.? : Business Communications Co.? 1988? . "April 1988." iii, 209 p. : ill. ; 28 cm. Includes bibliographical references. (NAL Call No.: DNAL HD9999.B442C66 1988).

1893

**The 1990-91 biotechnology regulations handbook /author/editor, Edward L. Korwek.**

Korwek, Edward L. Fairfax Station, Va. : Center for Energy and Environmental Management, 1990. Title from cover.~ On title page: Federal regulation of biotechnology. xiv, 197 p. : 28 cm. (NAL Call No.: DNAL KF1893.B56K6).

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1894

**Application of biotechnology environmental and policy issues /edited by John R. Fowle, III.**  
Fowle, John R. Boulder, Colo. : Westview Press, 1987. xi, 242 p. : ill. ; 22 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP248.2.A75).

1895

**Biopharmaceuticals in transition /Industrial Biotechnology Association, Paine Webber, Bio/Technology.**  
Woodlands, Tex. : Portfolio Pub. Co. ; Houston : Gulf Pub. Co., Book Division, c1990. Taken from Bio/technology magazine, from presentations at the Eighth Annual Meeting of the Industrial Biotechnology Association held in Washington, Oct. 11-13, 1989, and from panel discussions at the Paine Webber-Bio/Technology Conference on Biopharmaceuticals Futures held in New York, Sept. 13-15, 1989. xvi, 400 p. : ill. ; 24 cm. Includes bibliographical references and index. (NAL Call No.: DNAL TP248.13.A382 v.10).

1896

**Bioprocess technology.**  
BPTEEP. New York : Dekker, . Bioprocess technology. Description based on: Vol. 2 (published in 1987). v. : ill. ; 24 cm. (NAL Call No.: DNAL TP248.2.B463).

1897

**Biotechnology and the human genome innovations and impact /edited by Avril D. Woodhead and Benjamin Barnhart ; technical editor, Katherine Vivirito.**  
Woodhead, Avril D.; Barnhart, Benjamin J. New York : Plenum Press, c1988. "Based on the Science Writers Workshop on Biotechnology and the Human Genome, held September 14-16, 1987, at Brookhaven National Laboratory, Upton, New York"--T.p. verso. viii, 175 p. : ill. ; 26 cm. Includes bibliographies and index. (NAL Call No.: DNAL QH431.S3778).

1898

**Biotechnology in human health and nutrition--January 1979-March 1991.**  
Warmbrodt, R.D. Beltsville, Md. : The Library. Quick bibliography series - U.S. Department of Agriculture, National Agricultural Library (U.S.). Bibliography. May 1991. (91-97). 41 p. (NAL Call No.: DNAL aZ5071.N3).

1899

**Biotechnology is in our future.**  
Reiners, N.M. Roth, D. Madison, Wis. : Extension Journal. Journal of extension. Fall 1989. v. 27. p. 19-20. Includes references. (NAL Call No.: DNAL 275.28 J82).

1900

**Biotechnology risk assessment issues and methods for environmental introductions /edited by Joseph Fiksel, Vincent T. Covello. --.**  
Fiksel, Joseph.; Covello, Vincent T. New York : Pergamon Press, c1986. "Final report to the Office of Science and Technology Policy Executive Office of the President."~ "Report no. NSF/PRA 8502286." xvii, 174 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP248.6.B58).

1901

**Biotechnology serving human needs Industrial Biotechnology Association.**  
Washington, D.C. : The Association, 1988? . 1 videocassette (17 min., 38 sec.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.292).

1902

**Biotechnology therapeutics.**  
BITHEJ. New York, N.Y. : M. Dekker, c1989-. Biotechnology therapeutics. Title from cover. v. : ill. ; 26 cm. (NAL Call No.: DNAL RM666.R37B56).

1903

**Briefing on risk assessment /document prepared by Ronald W. Hart, Angelo Turturro, National Center for Toxicological Research.**  
Industrial Biotechnology Association (U.S.).~Meeting\_(1986 : Saint Louis, Mo.). Hart, Ronald W.; Turturro, Angelo. Jefferson, Ark. : The Center, U.S. Department of Health and Human Services, 1986. "Industrial Biotechnology Association Meeting, St. Louis, Mo., May 1, 1986"--cover. 1 v. (various pagings) ; 28 cm. Includes bibliographies. (NAL Call No.: DNAL RA427.3.I5 1986).

1904

**Comparison of health risk assessment models with ecological risk assessment models.**  
Silvers, A. Oakland : Division of Agricultural and Natural Resources, University of California, c1990. Risk assessment in agricultural biotechnology : proceedings of the International Conference, August 1988 / technical authors, James J. Marois, and George Bruening . p. 175-180. Includes references.



(NAL Call No.: DNAL S494.5.B563R5).

1905

**Genetic engineering and biotechnology related firms worldwide directory.**

Sittig, Marshall.; Noyes, Robert. Kingston, N.J. : Sittig and Noyes, c1986-. Title from cover.~ "Technical highlights & funding sources.". v. ; 28 cm. (NAL Call No.: DNAL QH442.G454).

1906

**Genetically engineered human therapeutic drugs / compiled by David N. Copsey, Sabine Y.J. Delnatte.**

Copsey, David N.; Delnatte, Sabine Y. J. New York, N.Y. : Stockton Press, c1988. viii, 675 p. ; 30 cm. Includes bibliographies. (NAL Call No.: DNAL RM301.G46).

1907

**Monoclonal antibodies production and application /editor, Avshalom Mizrahi.**

Mizrahi, A. New York : Liss, c1989. xv, 417 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP248.13.A38 v.11).

1908

**Protein tailoring for food and medical uses /edited by Robert E. Feeney, John R. Whitaker.**

Feeney, Robert Earl.; Whitaker, John R. New York : M. Dekker, c1986. Abstract: An authoritative reference text for food scientists and technologists, nutritionists, protein researchers, and medicinal and agricultural chemists and biochemists provides 14 technical reviews presented at a 1985 symposium focusing on protein modifications of interest in both foods and medicine. Five of the reviews discuss food applications (e.g.: covalent binding of essential amino acids to proteins to improve their nutritional and functional properties; enzymatic modifications of food protein properties; chemical structure-taste relationships in peptides; opioid peptides synthesized from milk proteins; genetic engineering of enzymes and food proteins). The remaining reviews either discuss medical applications via protein engineering (e.g.: enzyme inactivators, protein toxins, immunotoxins, therapeutic enzyme modifications, metal-protein complexes, antitumor protein drugs) or the current technological status for tailoring proteins for food and medical uses.~ Chemical structures, tabular data, and illustrations are provided throughout the text and literature citations are appended to each review. Based on an American Chemical Society symposium held Sept. 8-13, 1985 in Chicago. xii, 392 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL QP551.P6977 1986).

1909

**Pseudomonas biotransformations, pathogenesis, and evolving biotechnology /edited by Simon Silver ... et al. .**

Silver, S. Washington, D.C. : American Society for Microbiology, c1990. Based on a symposium held in Chicago, Ill., in July, 1989; sponsored by the American Society for Microbiology. xxiv, 423 p. : ill. ; 26 cm. Includes bibliographical references and index. (NAL Call No.: DNAL QR82.P78P78).

1910

**Risk Assessment and Risk Management Seminar Sheraton St. Louis Hotel, May 1, 1986, St. Louis, Missouri.**

St. Louis, Mo.? : Industrial Biotechnology Association, 1986?. Cover title. 101 p. ; 30 cm. (NAL Call No.: DNAL RA427.3.R5 1986).

1911

**Therapeutic peptides and proteins assessing the new technologies /edited by Daniel R. Marshak, Darrell T. Liu.**

Marshak, Daniel R.; Liu, Teh-Yung, 1932-. Cold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory, 1988. Based on a conference held Apr. 12-15, 1987, sponsored by Abbott Laboratories and others.~ Includes bibliographies and index. xv, 347 p. : ill. ; 24 cm. (NAL Call No.: DNAL QH426.B35 no.29).

1912

**Using fault analysis methods to improve bioreactor safety.**

ANYAA9. Jefferis, R.P. III. Schlager, S.T. New York, N.Y. : The Academy. Annals of the New York Academy of Sciences. Presented at the Fourth International Conference on Biochemical Engineering, October 1-5, 1984, Galway, Ireland. May 22, 1986. v. 469. p. 53-62. ill. Includes references. (NAL Call No.: DNAL 500 N484).



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1913

Network thermodynamics, heat and mass transfer in biotechnology presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, Boston, Massachusetts, December 13-18, 1987 /sponsored by the Bioengineering Division, ASME, the Heat Transfer Division, ASME ; edited by K.R. Diller.  
American Society of Mechanical Engineers.~Winter Meeting\_(1987 :\_Boston, Mass.). Diller, K. R. New York, N.Y. (345 E. 47th St., New York 10017) : ASME, c1987. vi, 111 p. : ill. ; 28 cm. Includes bibliographies. (NAL Call No.: DNAL R856.A2A44).

# CHEMISTRY

1914

**Active sites of enzymes /editors, Frances A. Journak and Alexander McPherson.**  
Journak, Frances A.; McPherson, Alexander, 1944-. New York : Wiley, c1987. "A Wiley-Interscience publication." xii, 564 p. : ill. ; 24 cm. Includes bibliographies and index. (NAL Call No.: DNAL QP801.P64B55 v.3).

1915

**Analytical biotechnology capillary electrophoresis and chromatography /Csaba Horvath, editor, John F. Nikelly, editor.**  
Horvath, Csaba, 1930-; Nikelly, J. G. Washington, DC : American Chemical Society, c1990. "Developed from a symposium sponsored by the Division of Analytical Chemistry at the 196th national Meeting of the American Chemical Society, Los Angeles, California, September 25-30, 1988." x, 213 p. : ill. ; 24 cm. Includes bibliographical references and index. (NAL Call No.: DNAL QD1.A45 no.434).

1916

**Biocatalysis and biomimetics /James D. Burrington, editor, Douglas S. Clark, editor.**  
Burrington, James D., 1951-; Clark, Douglas S., 1957-. Washington, DC : American Chemical Society, c1989. "Developed from a symposium sponsored by the Divisions of Petroleum Chemistry, Inc., and of Industrial and Engineering Chemistry, Inc., as part of the program of the Biotechnology Secretariat at the Third Chemical Congress of North America (195th National Meeting of the American Chemical Society), Toronto, Ontario, Canada, June 5-11, 1988." xiii, 169 p. : ill. (some col.) ; 24 cm. Includes bibliographies and indexes. (NAL Call No.: DNAL QD1.A45 no.392).

1917

**Biomass conversion technology principles and practice /editor, M. Moo-Young, associate editors, J. Lamptey, B. Glick, H. Bungay.**  
Moo-Young, Murray. New York : Pergamon Press, c1987. vi, 211 p. : ill. ; 27 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP248.B55B55).

1918

**Bioseparation and purification technologies BioConferences International, Inc.**  
Potomac, MD : BioConferences International, 1991. Discusses which type of chromatographic process to use for which separation and protein purification format and the need to define what the final product should be and therefore what strategy is needed to accomplish this goal and to market the product. Also discusses how to use the various separation and purification techniques. Videorecording of session at

BioEast'91 held in Washington, DC, Jan 6-9, 1991, sponsored by BioConferences International, Inc., Genetic Engineering News, IBEX; co-sponsored by the Pennsylvania State University Biotechnology and Bioprocessing Resource Center. 1 videocassette (68 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.1140).

1919

**Biotechnology and applied biochemistry.**  
Orlando, FL : Academic Press, c1986-. Biotechnology and applied biochemistry. Title from cover. v. : ill. ; 26 cm. (NAL Call No.: DNAL QD415.A1J63).

1920

**Biotechnology and materials science chemistry for the future /Mary L. Good, editor, Jacqueline K. Barton, associate editor ... et al.**  
Good, Mary L., 1931-; Barton, Jacqueline K. Washington, DC : American Chemical Society, 1988. xix, 135 p. : ill. ; 26 cm. Includes bibliographies and index. (NAL Call No.: DNAL TP248.2.B5512).

1921

**Biotechnology in agricultural chemistry /Homer M. LeBaron, editor ... et al.**  
LeBaron, Homer M. Washington, D.C. : American Chemical Society, 1987. "Developed from a symposium sponsored by the Divisions of Agrochemicals, Agricultural and Food Chemistry, and Fertilizer and Soil Chemistry at the 190th Meeting of the American Chemical Society, Chicago, Illinois, September, 8-13, 1985." xxii, 367 p. : ill. ; 24 cm. Includes bibliographies and indexes. (NAL Call No.: DNAL QD1.A45 no.334).

1922

**Directory of North Carolina scientists in fields related to biotechnology /North Carolina Biotechnology Center. --.**  
Research Triangle Park, N.C. : The Center, 1986. "Winter, 1986."~ Includes indexes. 557 p. ; 28 cm. (NAL Call No.: DNAL TP248.2.D5 1986).

1923

**Enzyme engineering 8 /edited by A.I. Laskin ... et al.**  
Laskin, Allen I., 1928-. New York, N.Y. : New York Academy of Sciences, 1987. "Papers presented at the Eighth International Enzyme Engineering Conference, which was held September 22-27, 1985 in Helsingor in Denmark"--Introd.~ Sponsored by the Engineering Foundation. xii, 573 p. : ill. ; 24 cm.

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Includes bibliographies and index. (NAL Call No.: DNAL 500 N484 v.501).

1924

**Extractive bioconversions /edited by Bo Mattiasson, Olle Holst.**  
Mattiasson, Bo, 1945-; Holst, Olle. New York : Marcel Dekker, c1991. xi, 328 p. : ill. ; 24 cm. Includes bibliographical references and index. (NAL Call No.: DNAL TP248.2.B463 v.11).

1925

**Facing the 1990's specialties, polymers, biotech, agriculture & the environment : February 5-7, 1990, Grand Hyatt San Francisco on Union Square, San Francisco, CA /Chemical Marketing Research Association.**  
Chemical Marketing Research Association.~Meeting\_(1990 : San Francisco, Calif.). Staten Island, NY : The Association, c1990. "Papers presented at the February 1990 Meeting of the Chemical Marketing Research Association ... San Francisco, CA.". 306 p. : ill. ; 22 cm. Includes bibliographical references and index. (NAL Call No.: DNAL HD9650.5.C4 1990).

1926

**Frontiers in bioprocessing /editors, Subhas K. Sikdar, Milan Bier, Paul Todd.**  
Sikdar, Subhas K.; Bier, Milan.; Todd, Paul, 1936-. Boca Raton, Fla. : CRC Press, 1990. Plenary lectures and poster presentations presented at a conference held June 28-July 2, 1987, Boulder, Colo. 440 p. : ill. ; 27 cm. Includes bibliographical references and index. (NAL Call No.: DNAL TP248.24.F76).

1927

**The Impact of chemistry on biotechnology multidisciplinary discussions /Marshall Phillips, editor ... et al. .**  
Phillips, Marshall. Washington, DC : American Chemical Society, 1988. "Developed from a symposium sponsored by the Biotechnology secretariat at the 192nd meeting of the American Chemical Society, Anaheim, California, September 7-12, 1986.". xiii, 415 p. : ill. ; 23 cm. Includes bibliographies and indexes. (NAL Call No.: DNAL QD1.A45 no.362).

1928

**North Carolina companies in biotechnology /North Carolina Biotechnology Center.**  
Research Triangle Park, N.C. : The Center, c1988. Includes indexes. iii, 92 p. ; 28 cm. (NAL Call No.: DNAL TP248.17.N67).

1929

**Use of PCR in testing for viruses BioConferences International, Inc.**  
Potomac, MD : BioConferences International, 1991. Panel discussion of PCR (polymerase chain reaction, a technique which can amplify amounts of DNA), its use in the detection of viral decontaminants in biologies, in testing for retroviruses, mutations, and other human virus forms; and its use in tests for cytomegalovirus. Videorecording of session at BioEast'91 held in Washington, D.C., Jan 6-9, 1991, sponsored by BioConferences International, Inc., Genetic Engineering News, IBEX; co-sponsored by the Pennsylvania State University Biotechnology and Bioprocessing Resource Center. 1 videocassette (115 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.1144).



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1930

**Advances in applied biotechnology series.**  
 AASEE6. Woodlands, Tex. : Portfolio Pub. Co. ;  
 Houston : Gulf Pub. Co., Book Division, c1989-.  
 Advances in applied biotechnology series. v. :  
 ill. ; 24 cm. (NAL Call No.: DNAL  
 TP248.13.A382).

1931

**Agriscience and technology /L. DeVere Burton.**  
 Burton, L. DeVere. Albany, NY : Delmar, c1992.  
 Includes index. x, 326 p., 8 leaves of plates  
 : ill. (some col.) ; 24 cm. (NAL Call No.: DNAL  
 S495.B97).

1932

**Applications of a new membrane print technique  
 in biotechnology.**  
 O'Neill, P.M. Singh, M.B.; Knox, R.B. New York  
 : Springer-Verlag, c1986. Biotechnology and  
 ecology of pollen : proceedings, International  
 Conference on Biotechnology and Ecology of  
 Pollen, 9-11 July 1985, Univ. of Massachusetts,  
 Amherst, MA / ed. by D.L. Mulcahy, G.B. Mulcahy  
 and E. Ottaviano. p. 203-208. ill. Includes  
 references. (NAL Call No.: DNAL QK658.B575).

1933

**ATCC quarterly newsletter.**  
 Rockville, MD : American Type Culture  
 Collection,. Description based on: Vol. 6, no.  
 3 (July 1986); title from caption. v. : ill.,  
 ports. ; 28 cm. (NAL Call No.: DNAL QH585.Q33).

1934

**Backlog of patent applications at the U.S.  
 Patent and Trademark Office and its effect on  
 small high-technology firmshearing before the  
 Subcommittee on Regulation and Business  
 Opportunities of the Committee on Small  
 Business, House of Representatives, One  
 Hundredth Congress, second session, Washington,  
 DC, March 29, 1988.**  
 United States.~Congress.~House.~Committee on  
 Small Business.~Subcommittee on Regulation and  
 Business Opportunities. Washington D.C. :  
 U.S. G.P.O. : For sale by the Supt. of Docs.,  
 Congressional Sales Office, U.S. G.P.O., 1988.  
 Distributed to some depository libraries in  
 microfiche.~ "Serial no. 100-59." iii, 181 p.  
 ; 23 cm. Includes bibliographical references.  
 (NAL Call No.: DNAL KF27.S675 1988a).

1935

**Bio Expo 86 proceedings, April 29 - May 1,  
 1986, Boston, MA / organized and presented by  
 Cahners Exposition Group . --.**  
 Stoneham, MA : Butterworths, 1986. Cover  
 title.~ "The American Commercial & Industrial  
 Conference & Exposition in Biotechnology."  
 xiv, 606 p. : ill. ; 28 cm. Includes  
 bibliographies and index. (NAL Call No.: DNAL  
 TP248.2.B5 1986).

1936

**Bioenvironmental systems /editor, Donald L.  
 Wise.**  
 Wise, Donald L. 1937-. Boca Raton, Fla. : CRC  
 Press, c1987. 4 v. : ill. ; 26 cm. Includes  
 bibliographies and index. (NAL Call No.: DNAL  
 TD769.B56).

1937

**BioFinancials 1989 Ernst & Young biotechnology  
 financial reporting survey /St ephen Buckley,  
 Jr., G. Steven Burrill, Kenneth B. Lee, Jr.**  
 Buckley, Stephen. Burrill, G. Steven.; Lee,  
 Kenneth B. San Francisco, CA : Ernst & Young,  
 c1989. Includes indexes. ix, 179 p. : ill. ; 28  
 cm. (NAL Call No.: DNAL HD9999.B43U6172).

1938

**BioInvention.**  
 Washington, D.C. : Omec International Inc.,.  
 BioInvention. Description based on: Vol. 5, no.  
 4 (Apr. 1986); title from cover. v. : ill. ; 28  
 cm. (NAL Call No.: DNAL TP248.2.B565).

1939

**Bioprocess technology.**  
 BPTEEP. New York : Dekker,. Bioprocess  
 technology. Description based on: Vol. 2  
 (published in 1987). v. : ill. ; 24 cm. (NAL  
 Call No.: DNAL TP248.2.B463).

1940

**Bioreactors for immobilized plant cell  
 cultures.**  
 ANYAA9. Shuler, M.L. Hallsby, G.A.; Pyne, J.W.  
 Jr.; Cho, T. New York, N.Y. : The Academy.  
 Annals of the New York Academy of Sciences.  
 Presented at the Fourth International  
 Conference on Biochemical Engineering, October  
 1-5, 1984, Galway, Ireland. May 22, 1986. v.  
 469. p. 270-278. ill. Includes references. (NAL  
 Call No.: DNAL 500 N484).



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1941

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### **Biotechnology policy--public perception, participation, and the law.**

YAXAA. Curry, J.R. Washington, D.C. : U.S. Department of Agriculture. The Yearbook of agriculture. 1986. p. 24-37. ill. Includes references. (NAL Call No.: DNAL 1 AG84Y).

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2010

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